Radiation Exposure Early in Life Can Be Reduced by Lung Ultrasound

To the Editor:

Serious concern has been raised lately about the negative effects of the ionizing irradiation exposure in diagnostic procedures (radiography, CT scan, angiography, radionucleide scan, PET scan, etc), which carries a potentially high risk for development of malignancies. Moreover, precocious exposure of infants and children to radiation may lead to a higher risk of developing malignancies later in life due to both the latency of the effect of radiation exposure on the cells and the fact that growing children are inherently more radiosensitive because they have a larger proportion of dividing cells. Sick neonates, mature and premature, still are regularly exposed to serial radiographic imaging for the diagnosis of pulmonary diseases, and it is not difficult to calculate how many millisieverts each newborn in the neonatal ICU can accumulate during the hospitalization.

Since 2005, our group has standardized and applied an ultrasonographic diagnostic approach for the pulmonary pathology of the newborn according to previous experiences in adults. Ultrasound images of uniformly aerated lungs are not visible as real images but as artifacts that appear black with regularly distributed horizontal white artifacts (A lines) representing the visual phenomenon of reverberance of the pleura within the aerated lung (Fig 1A). In the presence of fluid in the interstitial space, in the alveoli, or in both, the artifacts are vertical (ultrasound lung comets) (Fig 1B), and tend to coalesce with increasing amount of fluid up to a totally white appearance (ultrasonographic white lung) (Fig 1C).

During the neonatal period, lung echography can be used to accurately diagnose transient tachypnea in the newborn, respiratory distress syndrome, atelectasis, pneumothorax, and bronchopulmonary dysplasia. Due to the accuracy of the diagnostic information obtained by lung echography in our institution, this method replaces radiography as the first-line diagnostic approach in this age. We believe that this technique should be understood as an extension of clinical examination and should be performed by the clinicians who know what they are searching and who understand what they see.

So far, the interest of the neonatal and pediatric community of specialists toward lung ultrasound is growing very slowly. However, we strongly believe that the use of ultrasound in respiratory diseases of the newborn and the child needs to be encouraged not just as a valid diagnostic alternative but as a necessary ethical choice.

Luigi Cattarossi, MD
Roberto Copetti, MD
Besa Poskurica, MD
Tolmezzo, Italy

Affiliations: From the Department of Paediatrics (Drs Cattarossi and Poskurica) and Department of Emergency Medicine (Dr Copetti), San Antonio Abate Hospital.

Financial/nonfinancial disclosures: The authors have reported to CHEST that no potential conflicts of interest exist with any companies/organizations whose products or services may be discussed in this article.

Correspondence to: Luigi Cattarossi, MD, San Antonio Abate Hospital, Tolmezzo Via Morgagni 8 IT-33028 Tolmezzo (Udine), Italy; e-mail: lcattarossi@hotmail.com

© 2011 American College of Chest Physicians. Reproduction of this article is prohibited without written permission from the American College of Chest Physicians (http://www.chestpubs.org/site/misc/reprints.xhtml).

DOI: 10.1378/chest.10-2338

REFERENCES


Correspondence
Telemonitoring and Intermediate Care

To the Editor:

COPD is a progressive disease responsible for significant morbidity and mortality. 1 In recent years, intermediate care has been developed by secondary and primary health professionals to provide a seamless approach to the delivery of intersectoral patient care. 2 The intermediate model of care improves choice for patients and aims to reduce morbidity from COPD exacerbations through community-based interventions, such as hospital at home and early supported discharge schemes. 3 Exacerbations of COPD have been linked with frequent emergency attendances, 4 hospitalization, 4 and a reduction in quality of life 5 and lung function, 6 and patients who experience an exacerbation may benefit from an intermediate model of care. 7

The monitoring of intermediate care patients has recently gained prominence with the advent of health technology. 7 We defined telemonitoring within intermediate care as the daily use of health technology by clinical staff at a health-care facility to remotely monitor a patient’s progress. The ability to have surveillance of the patient’s clinical data while the patient is at home is proving to be of interest to clinicians and commissioners of services. 8 However, telemonitoring in the intermediate care patient population may provide information that previously proved to be elusive to capture and could contribute to a central hub of clinical decision making.

We recently reviewed > 1,000 articles and were able to identify a very small number of high-quality studies (Table 1) that have attempted to use telemonitoring as an adjunct clinical tool within intermediate care alongside or as a comparison with “best” guideline-based practice. Many studies that we reviewed simply described the technology. Our primary outcome measures were hospital readmission rates, length of stay, unscheduled health care, and exacerbations at home, and secondary outcomes were changes in health behavior and quality of life. Our review found a lack of telemonitoring homogeneity because of the different technologies used in these studies and the fact that many studies reported high attrition rates. Of particular interest, some studies reduced readmission rates and length of stay; however, these improvements were not mirrored in positive changes in quality-of-life scores. Although it appears that several studies did seem to show a change in the number of unscheduled care events, the differing types of technology used, their monitoring schedules, patient populations, and the lack of a guideline-based best practice comparator according to the intermediate care guideline 8 brings a challenge to the clinical interpretation of these results. It has been previously noted that intermediate care may not be a suitable option for 75% of patients with COPD presenting to hospitals for assessment of an exacerbation, 9 and technology reduces this potential number of patients further. On completing this review, we find it difficult to recommend to commissioners the addition of this technology to intermediate care and see the need for better quality studies in the future that can establish a clear role for telemonitoring as an adjunct to intermediate care.

Table 1—Characteristics of Studies Included in the Final Analysis

<table>
<thead>
<tr>
<th>Study/Year</th>
<th>Population</th>
<th>Technology</th>
<th>Length of Time</th>
<th>Patients Use Equipment</th>
<th>Reported Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maiolo et al 2003</td>
<td>Severe respiratory failure (COPD and restrictive disease) that required LTOT. Comparator: face-to-face outpatient medical visits at 3-month intervals</td>
<td>Pulse oximeter with modem for oxygen saturation readings twice a week in addition to three monthly visits to hospital clinic</td>
<td>12 mo</td>
<td>Readmissions, exacerbations at home</td>
<td></td>
</tr>
<tr>
<td>Whitten and Mickus 2007</td>
<td>COPD/CHF posthospital. Comparator: traditional face-to-face home visits</td>
<td>Video visits once a week with technological peripherals for vital signs monitoring along with usual care</td>
<td>Reported as mean length of time 10.7 wk</td>
<td>SF-36 scores, qualitative interviews, Outcome and Assessment Information Set</td>
<td></td>
</tr>
<tr>
<td>Trappenburg et al 2008</td>
<td>COPD with at least one exacerbation in previous year. Comparator: usual care, outpatient and GP appointments</td>
<td>Vital signs, symptoms, medication compliance, disease information via technology; nurse viewed data Monday to Friday</td>
<td>6 mo</td>
<td>HRQoL, readmissions, exacerbations at home, length of stay, unscheduled care, type and quantity of medication prescribed</td>
<td></td>
</tr>
<tr>
<td>Vitacca et al 2009</td>
<td>Chronic respiratory failure on oxygen or home ventilation. Comparator: usual care, outpatient visits at 3-month intervals.</td>
<td>24-h on-call service and pulse oximetry with modem; nurse viewed data Monday to Friday</td>
<td>12 mo</td>
<td>Readmissions, exacerbations at home, cost-effectiveness</td>
<td></td>
</tr>
</tbody>
</table>

CHF = congestive heart failure; GP = general practitioner; HRQoL = health-related quality of life; LTOT = long-term oxygen therapy; SF-36 = short-form 36 health survey questionnaire.

*Readmission indicates patients were hospitalized.

Unscheduled care may be ED attendance, emergency GP visits, or other unexpected health service use.

www.chestpubs.org

CHEST / 139 / 3 / MARCH, 2011 731